**3GPP TSG- Meeting #R4-2002793**

**Electronic Meeting, 24th Feb. – 6th Mar. 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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|  | | | | | | | | | | |
| ***Title:*** | CR on UE system parameters for NR V2X UE for TS 38.101-1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | vivo | | | | | | | | | |
| ***Source to TSG:*** | RAN4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_V2X\_NRSL | | | | |  | ***Date:*** | | | 2020-3-2 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Introduction of system parameters in band n47 for NR V2X operation. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add content of operating bands for NR V2X to Section 5.2 and 5.2E;  Add content of channel bandwidth for NR V2X to Section 5.3E;  Add content of channel raster and sync raster to Section 5.4E. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | No system parameters defined for NR V2X operation in band n47. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.2, 5.2E, 5.3E, 5.4E | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**<Start of Changes>**

5.2 Operating bands

NR is designed to operate in the FR1 operating bands defined in Table 5.2-1.

NR V2X is designed to operate in the NR operating bands n38, n47 which are defined in Table 5.2-1.

**Table 5.2-1: NR operating bands in FR1**

|  |  |  |  |
| --- | --- | --- | --- |
| **NR operating band** | **Uplink (UL) *operating band* BS receive / UE transmit**  **FUL\_low  – FUL\_high** | **Downlink (DL) *operating band* BS transmit / UE receive**  **FDL\_low – FDL\_high** | **Duplex Mode** |
| n1 | 1920 MHz – 1980 MHz | 2110 MHz – 2170 MHz | FDD |
| n2 | 1850 MHz – 1910 MHz | 1930 MHz – 1990 MHz | FDD |
| n3 | 1710 MHz – 1785 MHz | 1805 MHz – 1880 MHz | FDD |
| n5 | 824 MHz – 849 MHz | 869 MHz – 894 MHz | FDD |
| n7 | 2500 MHz – 2570 MHz | 2620 MHz – 2690 MHz | FDD |
| n8 | 880 MHz – 915 MHz | 925 MHz – 960 MHz | FDD |
| n12 | 699 MHz – 716 MHz | 729 MHz – 746 MHz | FDD |
| n14 | 788 MHz – 798 MHz | 758 MHz – 768 MHz | FDD |
| n18 | 815 MHz – 830 MHz | 860 MHz – 875 MHz | FDD |
| n20 | 832 MHz – 862 MHz | 791 MHz – 821 MHz | FDD |
| n25 | 1850 MHz – 1915 MHz | 1930 MHz – 1995 MHz | FDD |
| n28 | 703 MHz – 748 MHz | 758 MHz – 803 MHz | FDD |
| n29 | N/A | 717 MHz – 728 MHz | SDL |
| n303 | 2305 Mhz – 2315 MHz | 2350 MHz – 2360 MHz | FDD |
| n34 | 2010 MHz – 2025 MHz | 2010 MHz – 2025 MHz | TDD |
| n3810 | 2570 MHz – 2620 MHz | 2570 MHz – 2620 MHz | TDD |
| n39 | 1880 MHz – 1920 MHz | 1880 MHz – 1920 MHz | TDD |
| n40 | 2300 MHz – 2400 MHz | 2300 MHz – 2400 MHz | TDD |
| n41 | 2496 MHz – 2690 MHz | 2496 MHz – 2690 MHz | TDD |
| n4711 | 5855 MHz - 5925 MHz | 5855 MHz - 5925 MHz | TDD |
| n48 | 3550 MHz – 3700 MHz | 3550 MHz – 3700 MHz | TDD |
| n50 | 1432 MHz – 1517 MHz | 1432 MHz – 1517 MHz | TDD1 |
| n51 | 1427 MHz – 1432 MHz | 1427 MHz – 1432 MHz | TDD |
| n65 | 1920 MHz – 2010 MHz | 2110 MHz – 2200 MHz | FDD4 |
| n66 | 1710 MHz – 1780 MHz | 2110 MHz – 2200 MHz | FDD |
| n70 | 1695 MHz – 1710 MHz | 1995 MHz – 2020 MHz | FDD |
| n71 | 663 MHz – 698 MHz | 617 MHz – 652 MHz | FDD |
| n74 | 1427 MHz – 1470 MHz | 1475 MHz – 1518 MHz | FDD |
| n75 | N/A | 1432 MHz – 1517 MHz | SDL |
| n76 | N/A | 1427 MHz – 1432 MHz | SDL |
| n77 | 3300 MHz – 4200 MHz | 3300 MHz – 4200 MHz | TDD |
| n78 | 3300 MHz – 3800 MHz | 3300 MHz – 3800 MHz | TDD |
| n79 | 4400 MHz – 5000 MHz | 4400 MHz – 5000 MHz | TDD |
| n80 | 1710 MHz – 1785 MHz | N/A | SUL |
| n81 | 880 MHz – 915 MHz | N/A | SUL |
| n82 | 832 MHz – 862 MHz | N/A | SUL |
| n83 | 703 MHz – 748 MHz | N/A | SUL |
| n84 | 1920 MHz – 1980 MHz | N/A | SUL |
| n86 | 1710 MHz – 1780 MHz | N/A | SUL |
| n89 | 824 MHz – 849 MHz | N/A | SUL |
| n90 | 2496 MHz – 2690 MHz | 2496 MHz – 2690 MHz | TDD5 |
| n91 | 832 MHz – 862 MHz | 1427 MHz – 1432 MHz | FDD9 |
| n92 | 832 MHz – 862 MHz | 1432 MHz – 1517 MHz | FDD9 |
| n93 | 880 MHz – 915 MHz | 1427 MHz – 1432 MHz | FDD9 |
| n94 | 880 MHz – 915 MHz | 1432 MHz – 1517 MHz | FDD9 |
| n958 | 2010 MHz – 2025 MHz | N/A | SUL |
| NOTE 1: UE that complies with the NR Band n50 minimum requirements in this specification shall also comply with the NR Band n51 minimum requirements.  NOTE 2: UE that complies with the NR Band n75 minimum requirements in this specification shall also comply with the NR Band n76 minimum requirements.  NOTE 3: Uplink transmission is not allowed at this band for UE with external vehicle-mounted antennas.  NOTE 4: A UE that complies with the NR Band n65 minimum requirements in this specification shall also comply with the NR Band n1 minimum requirements.  NOTE 5: Unless otherwise stated, the applicability of requirements for Band n90 is in accordance with that for Band n41; a UE supporting Band n90 shall meet the requirements for Band n41.  NOTE 6: A UE that supports NR Band n66 shall receive in the entire DL operating band.  NOTE 7: A UE that supports NR Band n66 and CA operation in any CA band shall also comply with the minimum requirements specified for the DL CA configurations CA\_n66B and CA\_n66(2A) in the current version of the specification.  NOTE 8: This band is applicable in China only.  NOTE 9: Variable duplex operation does not enable dynamic variable duplex configuration by the network, and is used such that DL and UL frequency ranges are supported independently in any valid frequency range for the band.  Note 10: This band is a licensed band which can be wholly used for NR V2X service in particular regions.  Note 11: This band is an unlicensed band restricted to NR V2X operation. | | | |

**<Unchanged parts omitted>**

5.2E Operating bands for V2X Communication

NR V2X communication is designed to operate in the operating bands in FR1 defined in Table 5.2E-1.

**Table 5.2E-1 NR V2X operating bands in FR1**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NR V2X Operating Band** | **Sidelink (SL) Transmission operating band** | | | **Sidelink (SL) Reception operating band** | | | **Duplex Mode** | **Interface** |
| **FUL\_low – FUL\_high** | | | **FDL\_low – FDL\_high** | | |
| n47 | 5855 MHz | - | 5925 MHz | 5855 MHz | - | 5925 MHz | TDD | PC5 |

5.3E UE channel bandwidth for V2X Communication

The NR V2X Communication channel bandwidths and operating bands are shown in Table 5.3E-1. The same (symmetrical) channel bandwidth is specified for both the TX and RX path.

**Table 5.3E-1 NR V2X Communication channel bandwidth**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **NR V2X band /SCS/ V2X channel bandwidth** | | | | | | | | |
| **NR V2X Operating Band** | **SCS**  **kHz** | **10 MHz** | **20 MHz** | **30 MHz** | **40 MHz** | **50 MHz** | **60 MHz** | **80 MHz** | **90 MHz** | **100 MHz** |
| n47 | 15 | Yes | Yes | Yes | Yes |  |  |  |  |  |
| 30 | Yes | Yes | Yes | Yes |  |  |  |  |  |
| 60 | Yes | Yes | Yes | Yes |  |  |  |  |  |

5.4E Channel arrangement for V2X Communication

5.4.1E Channel spacing for V2X Communication

5.4.2E Channel raster for V2X Communication

5.4.2.1E NR-ARFCN and channel raster

The NR-ARFCN and channel raster defined in subclause 5.4.2.1 in TS38.101-1 are applied for NR V2X.

For NR V2X UE, the reference frequency can be shifted by configuration.

FREF\_V2X = FREF + Δshift + N \* 5 kHz

where

Δshift = 0 kHz or 7.5 kHz indicated in IE (*frequencyShift7p5khz*), and

N can be set as one of following values {-1, 0, 1}, are signalled by the network in higher layer parameters or configured by pre-configuration parameters.

5.4.2.2E Channel raster to resource element mapping

Channel raster to resource element mapping defined in subclause 5.4.2.2 in TS38.101-1 are applied for NR V2X.

5.4.2.3E Channel raster entries for each operating band

The channel raster entries for each operating band defined in subclause 5.4.2.3 in TS38.101-1 are applied for NR V2X. The RF channel positions on the channel raster in each NR V2X operating band are given through the applicable NR-ARFCN in Table 5.4.2.3E-1, using the channel raster to resource element mapping in subclause 5.4.2.2E.

For NR V2X operating band n47, ΔFRaster = *I* × ΔFGlobal, where *I ϵ {1,[2],[4]}.* Every *Ith* NR‑ARFCN within the operating band are applicable for the channel raster within the operating band and the step size for the channel raster in table 5.4.2.3E-1 is given as <*I*>.

**Table 5.4.2.3E-1: Applicable NR-ARFCN for NR V2X operating band**

|  |  |  |  |
| --- | --- | --- | --- |
| **NR operating band** | **ΔFRaster**  **(kHz)** | **Uplink range of NREF**  **(First – <Step size> – Last)** | **Downlink range of NREF**  **(First – <Step size> – Last)** |
| n47 | 15 | 790334 – <1> – 795000 | 790334 – <1> – 795000 |
| [30] | [790334 – <2> – 795000] | [790334 – <2> – 795000] |
| [60] | [790334 – <4> – 795000] | [790334 – <4> – 795000] |

5.4.3E Synchronization raster for V2X Communication

There is no synchronization raster definition for NR V2X for both licensed bands and unlicensed bands.

5.4.4E TX–RX frequency separation for V2X Communication

**<End of Changes>**